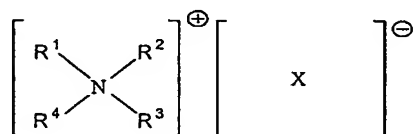


What is claimed is:

- 1 1. A polymer-cellulosic fiber composition comprising from about 30 to
2 about 70 wt. % polymer, from about 70 to about 30 wt. % cellulosic fiber, and from
3 about 1 to about 7 phc of a quaternary ammonium alkyl salt having the formula:



- 4
5 wherein X is an alkyl carboxylate -O-C(O)R, alkyl sulfate -OS(O)₂OR, alkyl
6 sulphonate
7 -S(O₂)OR, alkyl phosphate -OP(O)OHOR, alkyl phosphite -OP(O)H-OR; R is an
8 alkyl group having from 8 to 22 carbon atoms, and R¹ is a long chain alkyl group or
9 a benzyl group and,

- 10 where the R¹ group is a long chain alkyl group, R² and R³ are short chain
11 alkyl groups and R⁴ is a short or long chain alkyl group and,

- 12 where R¹ is a benzyl group, R² is a short chain alkyl group and R³ and R⁴
13 are each either short or long chain alkyl groups;
14 said long chain alkyl groups having from 8 to 22 carbon atoms and said short chain
15 alkyl groups have from 1 to 4 carbon atoms.

- 1 2. The polymer-cellulosic fiber composition of claim 1, wherein the
2 long chain alkyl group has from 8 to 22 carbon atoms and the short chain alkyl
3 group has from 1 to 4 carbon atoms.

1 3. The polymer-cellulosic fiber composition of claim 1 wherein the
2 quaternary ammonium alkyl salt is an alkyldimethylbenzyl ammonium lauryl, an
3 alkyl trimethyl ammonium lauryl or a dialkyl dimethyl ammonium lauryl salt, or a
4 combination thereof.

1 4. The polymer-cellulosic fiber composition of claim 1, wherein the R
2 group contains from 10 to 18 carbon atoms.

1 5. The polymer-cellulosic fiber composition of claim 3, wherein the
2 alkyldimethylbenzyl ammonium alkyl salt is alkyldimethylbenzyl ammonium lauryl
3 sulfate.

1 6. The polymer-cellulosic fiber composition of claim 5, wherein the
2 alkyl group in the alkyldimethylbenzyl ammonium lauryl sulfate contains 40% C₁₂,
3 50% C₁₄ and 10% C₁₆.

1 7. The polymer-cellulosic fiber composition of claim 3, wherein the
2 quaternary ammonium alkyl salt is didecyldimethyl ammonium lauryl sulfate.

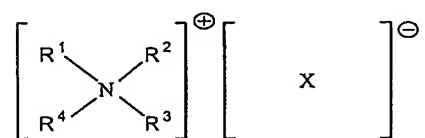
1 8. The polymer-cellulosic fiber composition of claim 1, wherein the
2 polymer is a high-density polyethylene.

1 9. The polymer-cellulosic composition of claim 1, wherein the cellulosic
2 fiber is oak, pine, or maple, straw, corn stalks, rice hulls, wheat, oat, barley, oat
3 chaff, coconut shells, peanut shells, walnut shells, jute, hemp, bagasse, bamboo,
4 flax, kenaf, or a combination thereof.

1 10. The polymer-cellulosic composition of claim 1, further comprising
2 about 0.001 to about 3.0 wt. %, based on weight of wood, of a biocide.

1 11. The polymer-cellulosic composition of claim 10, wherein the biocide
2 is a copper compound, a zinc compound, an azole, an isothiazolone, a carbamate, or
3 a combination thereof.

1 12. An extrudable composition comprising from about 30 to about 70
2 wt. % polymer, from about 70 to about 30 wt. % cellulosic fiber and from about 1 to
3 about 7 phc of a quaternary ammonium alkyl salt having the formula:



4
5 wherein X is an alkyl carboxylate -O-C(O)R, alkyl sulfate -OS(O)₂OR, alkyl
6 sulphonate
7 -S(O₂)OR, alkyl phosphate -OP(O)OHOR, alkyl phosphite -OP(O)H-OR; R is an
8 alkyl group having from 8 to 22 carbon atoms, and R¹ is a long chain alkyl group or
9 a benzyl group and,

10 where the R¹ group is a long chain alkyl group, R² and R³ are short chain
11 alkyl groups and R⁴ is a short or long chain alkyl group and,

12 where R¹ is a benzyl group, R² is a short chain alkyl group and R³ and R⁴
13 are each either short or long chain alkyl groups;

14 said long chain alkyl groups having from 8 to 22 carbon atoms and said short chain
15 alkyl groups have from 1 to 4 carbon atoms.

1 13. The extrudable composition of claim 12, wherein the long chain alkyl
2 group has from 8 to 22 carbon atoms and the short chain alkyl group has from 1 to
3 4 carbon atoms.

1 14. The extrudable composition of claim 12 wherein the quaternary
2 ammonium alkyl salt is an alkyldimethylbenzyl ammonium lauryl, an alkyl trimethyl
3 ammonium lauryl or a dialkyl dimethyl ammonium lauryl salt, or a combination
4 thereof.

1 15. The extrudable composition of claim 14, wherein the R group
2 contains from 10 to 18 carbon atoms.

1 16. The extrudable composition of claim 14, wherein the
2 alkyldimethylbenzyl ammonium alkyl salt is alkyldimethylbenzyl ammonium lauryl
3 sulfate.

1 17. The extrudable composition of claim 16, wherein the alkyl group in
2 the alkyldimethylbenzyl ammonium lauryl sulfate contains 40% C₁₂, 50% C₁₄ and
3 10% C₁₆ alkyl.

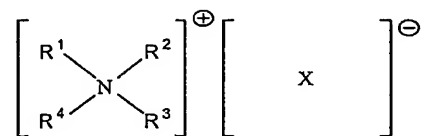
1 18. The extrudable composition of claim 14, wherein the quaternary
2 ammonium alkyl salt is didecyldimethyl ammonium lauryl sulfate.

1 19. The extrudable composition of claim 12, wherein the polymer is a
2 high-density polyethylene.

1 20. The extrudable composition of claim 12, wherein the cellulosic fiber
2 is oak, pine, or maple, straw, corn stalks, rice hulls, wheat, oat, barley, oat chaff,
3 coconut shells, peanut shells, walnut shells, jute, hemp, bagasse, bamboo, flax,
4 kenaf, or a combination thereof.

1 21. A method of preventing decay of a polymer-wood composite
2 comprising mixing a quaternary ammonium alkyl salt into an extrudable
3 composition containing a polymer and cellulosic fibers before performing an

4 extrusion process on the extrudable composition, wherein the quaternary ammonium
5 alkyl salt has the following formula:



6
7 wherein X is an alkyl carboxylate -O-C(O)R, alkyl sulfate -OS(O)₂OR, alkyl
8 sulphonate
9 -S(O₂)OR, alkyl phosphate -OP(O)OHOR, alkyl phosphite -OP(O)H-OR; R is an
10 alkyl group having from 8 to 22 carbon atoms, and R¹ is a long chain alkyl group or
11 a benzyl group and,

12 where the R¹ group is a long chain alkyl group, R² and R³ are short chain
13 alkyl groups and R⁴ is a short or long chain alkyl group and,

14 where R¹ is a benzyl group, R² is a short chain alkyl group and R³ and R⁴
15 are each either short or long chain alkyl groups;

16 said long chain alkyl groups having from 8 to 22 carbon atoms and said short chain
17 alkyl groups have from 1 to 4 carbon atoms.

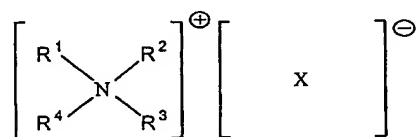
1 22. The method of claim 21 wherein the quaternary ammonium alkyl salt
2 is an alkyldimethylbenzyl ammonium lauryl, an alkyl trimethyl ammonium lauryl or
3 a dialkyl dimethyl ammonium lauryl salt, or a combination thereof.

1 23. The method of claim 22, wherein the alkyldimethylbenzyl ammonium
2 alkyl salt is alkyldimethylbenzyl ammonium lauryl sulfate.

1 24. The method of claim 22, wherein the quaternary ammonium alkyl salt
2 is didecyldimethyl ammonium lauryl sulfate.

1 25. The method of claim 21, wherein the polymer-wood composite
2 contains 30 to 70 wt. % of polymer, 70 to 30 wt. % of cellulosic fiber, and from 1 to
3 7 phr of the quaternary ammonium alkyl salt

1 26. A quaternary ammonium alkyl salt having the formula:



2
3 wherein X is an alkyl sulphonate -S(O₂)OR, an alkyl phosphate -OP(O)OHOR, or
4 an alkyl phosphite -OP(O)H-OR; R is an alkyl group having from 8 to 22 carbon
5 atoms, and R¹ is a long chain alkyl group or a benzyl group and,

6 where the R¹ group is a long chain alkyl group, R² and R³ are short chain
7 alkyl groups and R⁴ is a short or long chain alkyl group and,

8 where R¹ is a benzyl group, R² is a short chain alkyl group and R³ and R⁴
9 are each either short or long chain alkyl groups.